



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/972,375	10/05/2001	Tsuyoshi Okawa	09792909-5214	4749

26263 7590 05/21/2003

SONNENSCHN NATH & ROSENTHAL  
P.O. BOX 061080  
WACKER DRIVE STATION  
CHICAGO, IL 60606-1080

EXAMINER

RUTHKOSKY, MARK

ART UNIT	PAPER NUMBER
----------	--------------

1745

DATE MAILED: 05/21/2003

7

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/972,375

Applicant(s)

OKAWA ET AL.

Examiner

Mark Ruthkosky

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 October 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Drawings***

2. The examiner has approved the drawings, filed on 10/5/2001.

### ***Specification***

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Non-aqueous Electrolyte Secondary Cell With a Lithium Metal Phosphate Cathode.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. With regard to claim 1, the range of the variable y in the electrode material is from 2.0 to 0.8. This would provide a material with a negative value that is not possible for a

Art Unit: 1745

compound. The number 2.0 appears to be a typographical error for what should read 0.2 as shown in the examples of the specification. With regard to claim 6 that indirectly depends from claim 1, the formula  $\text{LiFePO}_4$  is not supported by the formula of claim 1 if y is in the range of 2.0 to 0.8 or 0.2 to 0.8. Thus, there is no antecedent basis for this compound in claim 1. This formula is used in claims 6-12 which are also considered indefinite for the reasons presented.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 3, 4, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goodenough et al. (US 5,910,382.) in view of JP 2646657.

The instant claims are to a non-aqueous secondary cell comprising a cathode active material containing the compound of an olivine structure of the formula  $\text{Li}_x\text{Fe}_{1-y}\text{M}_y\text{PO}_4$ , as claimed, an electrolyte and an anode, where the contents are housed in a container and wherein the amount of electrolyte solution in the container is adjusted to provide a void in the container of not less than 0.14 cc and not larger than 3.3 cc per 1 Ah of the cell capacity.

Goodenough et al. (US 5,910,382) teaches a cathode active material containing the compound of an olivine structure of the formula  $\text{Li}_x\text{Fe}_{1-y}\text{M}_y\text{PO}_4$ , for a non-aqueous secondary cell, an electrolyte and an anode, where the contents are housed in a container.  $\text{LiFePO}_4$  is specifically noted. Lithium intercalating carbonaceous coke is noted as an anode material (col.

Art Unit: 1745

1, lines 35-45.) Liquid, solid and polymer electrolytes are noted. The reference shows that practical amounts of electrolyte are added to the cell (col. 6, lines 1-25.) The reference does not teach the amount of electrolyte solution in the container adjusted to provide a void in the container of not less than 0.14 cc and not larger than 3.3 cc per 1 Ah of the cell capacity. JP 2646657 teaches a non-aqueous lithium secondary cell having a wound electrode assembly in a container with an electrolyte, where the battery is formed with a specific void ratio made by adjusting the quantity of electrolyte to provide a clearance of 0.3 cc. The void area prevents deformation or leakage due to gas generated during discharge and charge of the battery. It would be obvious to one of ordinary skill in the art at the time the invention was made to adjust the void area of the cell in order to allow for a proper amount of space based on the amount of gas released by the electrode material. The artisan would have found the claimed invention to have been obvious in light of the teachings of the references. JP 2646657 teaches adjusting the quantity of electrolyte to provide a void ratio clearance that prevents deformation or leakage of the container due to gas generated by the battery. Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation, MPEP 2144.05.

With regard to claim 4, it would be obvious to one of ordinary skill in the art at the time the invention was made to prepare a cell of a non-aqueous lithium secondary cell having a wound electrode assembly in a container with an electrolyte including a cathode material of  $\text{Li}_x\text{Fe}_{1-y}\text{M}_y\text{PO}_4$ , as taught by Goodenough. A layered structure with a separator between the electrodes is known in the art to provide a cylindrical electrode assembly capable of transferring electrons and ions as shown in JP 2646657. The electrode material as taught by Goodenough

Art Unit: 1745

will provide a positive active material which will transfer electrons in a manner equivalent to the lithium metal oxide as taught in JP 2646657.

8. Claims 2 and 5-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goodenough et al. (US 5,910,382.) in view of JP 2646657 as applied to claim 1 above, and further in view of Barker et al. (US 5,871,866.)

Goodenough et al. (US 5,910,382) teaches a non-aqueous secondary cell including a cathode with an active material of the formula  $\text{Li}_x\text{Fe}_{1-y}\text{M}_y\text{PO}_4$ , an electrolyte and an anode with the assembly housed in a container. Goodenough et al. (US 5,910,382) does not teach the details of the battery to include a cathode active material mixed with a carbonaceous conductive material, an anode of a carbonaceous material or a wound electrode assembly housed in a container. Barker et al. (US 5,871,866), however, teaches the state of the art with regard to lithium non-aqueous secondary cells. The claimed feature are broadly known in the art as shown by Barker which teaches a non-aqueous secondary cell including a cathode with an active material of the formula  $\text{Li}_x\text{M}_{1-y}\text{M}_y(\text{PO}_4)_3$ , an electrolyte and an anode with the assembly housed in a container. The positive electrode is shown to include 5-30% of an electrically conductive carbon material (col. 6, lines 35-end.) The BET surface area is about 65 square meters per gram. The negative electrode is shown to be made of a lithium intercalating carbon material (col. 1, lines 35-50; col. 3, lines 25-35; col. 7, lines 35-end.) The electrodes are pasted onto a conductive metal current collector (col. 7.) It would be obvious to one of ordinary skill in the art at the time the invention was made to mix the cathode materials of Goodenough with a conductive carbon as taught in Barker et al. (US 5,871,866) and to add the mixture to both sides of the current

Art Unit: 1745

collector of as it is well known in the art that mixing the active material with a conductive carbon will provide increased electronic transfer to and from the electrode materials.

With regard to claim 8, the Raman spectrum of the material will be inherent to the material that is taught in Goodenough. With regard to claims 7 and 9, the references are silent to particle sizes and powder densities of the materials. As the range of particle sizes for electrode materials are well described in the art, the size and density of the mixture of materials may be chosen by routine experimentation. Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation, MPEP 2144.05.

The artesian would have found the claimed invention to have been obvious in light of the teachings of the references. Unexpected results for the particle sizes, as claimed, are necessary to overcome the rejection.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited art does not read upon the instant claims, however, the references include general teachings and relevant features as to the state of the art at the time of the invention.

### ***Examiner Correspondence***

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1193. Any inquiry concerning this communication or earlier communications from the examiner should be directed

Art Unit: 1745

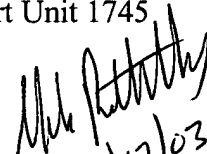
to Mark Ruthkosky whose telephone number is 703-305-0587. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:00.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 703-308-2383.

The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Mark Ruthkosky

Patent Examiner

Art Unit 1745



5/17/03